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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/825,303 | 04/16/2004 | Yasushi Takai | 0171-1056P | 7758 |

2292 7590 02/10/2005

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| EXAMINER | |
|---|---|
| MCNEIL, JENNIFER C | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1775 | |

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/825,303 | TAKAI ET AL. | |
| | Examiner | Art Unit | |
| | Jennifer C McNeil | 1775 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *24 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Subramanian (US 6,294,260). Subramanian teaches a barrier coating for turbine components. The barrier coating comprises an oxide with the base structure of $(A,B)_XO_Y$. A and B may be selected from rare earth elements such as La, Dy, Ho, Er, Gd, Yb, Eu, and Sm. Subramanian teaches that the substrate may be a superalloy with a composition including Cr.Al.Co.Ta.Mo.W (col. 1, lines 31-35).

Regarding claim 4, as stated above, both A and B may be a rare earth, such as Yb.

Regarding claim 5, the thickness of the layer may be 0.0112-0.254 cm.

Regarding claim 7, the process by which the product is made has not been shown to structurally define over the prior art.

Claims 1, 2, and 7 are rejected under 35 U.S.C. 102(a) as being anticipated by Maloney (US 6,177,200). Maloney teaches a ceramic material used as a thermal barrier on metal substrates. The ceramic material comprises the composition $A_2B_2O_7$, wherein A may be gadolinium, lanthanum, yttrium or mixtures thereof, and B may be zirconium, hafnium, titanium, and mixtures thereof. The substrate may be an iron, nickel, or cobalt based metal and containing chromium and aluminum and usually

containing titanium and refractory metals. Other substrates that may be used include steels, and titanium alloys.

Regarding claim 7, the process by which the product is made has not been shown to structurally define over the prior art.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beele (US 6,387,526) in view of Strangman (US 5,514,482). Beele teaches a thermal barrier layer including a substrate of an iron, cobalt or nickel superalloy and a layer of an oxide having the structure $A_2B_2O_7$, wherein A may be samarium, gadolinium or europium. Therefore this layer is a rare-earth containing oxide. Beele does not specifically teach a nickel superalloy substrate alloys with one of the elements of the instant claims. Nickel, iron, and cobalt superalloys are well known in the art of turbine engines. Strangman teaches some common nickel-superalloys as shown in Table 1. Each superalloy includes at least one of the elements listed in instant claim 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use on of the commonly known superalloys of Strangman as the superalloy substrate in Beele, as they are both used in turbine engine components for their high temperature durability.

Regarding claim 3, Beele teaches that ytterbium, samarium, or europium may be the rare-earth element.

Regarding claim 5, Beele does not teach a specific thickness of the thermal barrier coating, however, absent a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a layer with sufficient thickness to provide the desired thermal barrier properties to the underlying substrate.

Regarding claim 6, an additional layer may be formed over the thermal barrier coating. The additional layer may comprise the same composition of the thermal barrier layer, wherein B is Hf or Zr, and A may be lanthanum (col. 6, lines 33-40).

Regarding claim 7, the process by which the product is made has not been shown to structurally define over the prior art.

Claims 1, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heimberg et al (US 6,440,575) in view of Strangman (US 5,514,482). Heimberg teaches a ceramic thermal layer for turbine engine components. The substrate is a nickel, cobalt, or chromium based superalloy. The substrate is coated with a bonding layer which when the underlying layer contains lanthanum, leads to the formation of lanthanum oxide in the bonding layer. Heimberg does not specifically teach a nickel superalloy substrate alloyed with one of the elements in the instant claims. Nickel, iron, and cobalt superalloys are well known in the art of turbine engines. Strangman teaches some common nickel superalloys shown in Table 1. Each superalloy includes at least one of the elements listed in instant claim 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use on of the commonly known superalloys of Strangman as the superalloy substrate in Heimberg, as they are both used in turbine engine components for their high temperature durability.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maloney (US 6,177,200). Maloney teaches a ceramic coating on a metal substrate as discussed above, but does not specify the

thickness of the ceramic coating. Absent a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a layer with sufficient thickness to provide the desired thermal barrier properties to the underlying substrate.

### *Response to Arguments*

Applicant's arguments filed November 24, 2004 have been fully considered but they are not persuasive. Applicant argues that Subramanian discloses only the substrate made of Ni or Co base superalloy containing Ta, Mo, or W as part of the alloy. Claim 1 specifically states "consisting essentially of a metal selected from the group consisting of Mo, Ta, W, Zr, Ti, and alloys thereof". With the inclusion of "and alloys thereof", the claim have been interpreted to mean alloys of Mo, Ta, W, Zr, or Ti. The superalloy taught by Subramanian is an alloy and may contain Ta, Mo, or W, and therefore is considered an alloy of Ta, Mo, or W. There is no reference in the claims to a substrate that is based on Mo, Ta, W, Zr, or Ti, which appears to be applicant's intent.

Regarding Maloney, Beele, and Strangman, applicant makes a similar argument.

Applicant refers to the lack of disclosure in these references of "the single use of Mo, Ta, W, Zr, or Ti, or alloys thereof". This is not commensurate with the claims. It appears that applicant intends that the substrate consist essentially of Mo, Ta, W, Zr, Ti, or alloys based on these specific metals. However, the claims do not reflect this limitation.

For these reasons, the rejections are held.

Applicant's cancellation of claim 8 has rendered the double patenting rejection moot.

### *Conclusion*

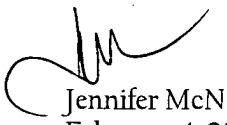
THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C McNeil whose telephone number is 571-272-1540. The examiner can normally be reached on 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer McNeil
February 4, 2005